Urban Sprawl Models for The Army Basing Study: *Resource for Future Planning to Avoid Encroachment*

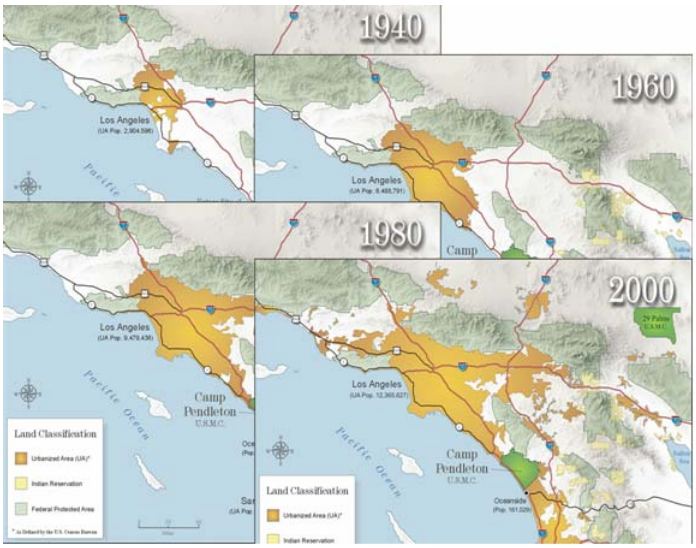
By William Goran, COL William Tarantino, and Brad Boesdorfer

Urban and suburban growth trend models created for nearly 100 installations to support the Total Army Basing Study (TABS) offer potential follow-on use in regional planning efforts. These "urban sprawl" analyses used a novel combination of data sources to consistently assess encroachment for all installations under the Base Realignment and Closure (BRAC) studies.

The models provide a forecast for urbanization to 2020 based on changes in land use from 10 years of historical data for 1- and 5-mile perimeters around an installation. Installations can use these results to augment planning activities with local communities for initiatives such as Installation Compatible Use Zones, (ICUZ, plus its Air Force and Navy counterparts), Army Compatible Use Buffers (ACUB), and the Joint Land Use Study (JLUS).

Encroachment and BRAC

The Defense community knows that encroachment constrains training and operations on land, in the skies, and on the seas. For soldiers to "train as they fight," it is essential that these



Camp Pendleton, Calif., urban growth

critical resources remain accessible for the full array of military missions. Population growth, urban expansion, and increased traffic are often competing demands for the availability of these resources, especially in the vicinity of military ranges and flight routes.

Over the past 30 years installations have been making concessions to their neighbors by moving ranges away from boundaries, curtailing night operations, and taking other action that negatively impact training. With the rapid pace of urban expansion during the 1990s, combined with growing constraints to training in compliance with the Endangered Species Act, the loss of range capability became a major concern to Army leadership. Encroachment was therefore included as an attribute in studying the military value (MV) of installations during BRAC05.

To measure encroachment consistently across all Army installations in the study, TABS needed a defendable, repeatable, and auditable method. The U.S. Army Engineer Research and Development Center (ERDC) had previously developed several map series to model changing land use patterns around military installations using methods validated in the scientific community. However, these maps included differing data sources and features that could introduce bias in attempting to make fair comparisons. TABS asked ERDC's Construction Engineering Research Laboratory (CERL) to develop a method that would meet MV analysis requirements.

Visualizing Urban Change

In addition to providing certified, consistent, and repeatable data sources, CERL needed to select data that was already available due to time and funding constraints. To meet the "consistent and comparable" criteria, researchers chose to leverage a product developed to support the base closure and realignment studies, the Installation Visualization Tool (IVT). This tool has included new imagery for several hundred installations. This source is commercially available as collected at high resolution (1 to 4 meters) from the Ikonos earth observation satellite. While this data is available for all installations, it represents only one point in time (roughly 2001-03). Since "trend over time" data was also needed, at least one additional source was required. Two options were available: the U.S. Geological Survey's National Land Cover Datasets (NLCD) and U.S. Census Bureau data, which could be used as an additional source of information on local populations and land use.

CERL used both options, although the NLCD data provided the main data source for the second point in time (about 1992). This data set met the TABS requirement for "repeatability." The resulting spatial analyses showed urban growth around installations from 1992-2003 as a percentage change. These historical models allowed the research team to develop projections for trends over the next 15 years.

Maps Available to Installations

Because of the TABS encroachment models' potential usefulness in future regional planning, the maps can be made available, upon request, to installation officials by the Office of the Deputy Assistant Secretary of the Army for Infrastructure Analysis. The information may be requested from Mr. Bill Goran at CERL, 217-373-6735, William.D.Goran@erdc.usace.army.mil.

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